was recommended, the serum-cell mixture being made by adding 1 part of cells to 4 parts of heated serum. This mixture was then combined with liquid agar in the proportion of 1 to 3, so that the final concentration was serum, 20 per cent.; cells, 5 per cent.; and agar, 75 per cent. This medium was found to be not only suitable for demonstrating the hemolytic zones of beta streptococcus but efficient in exhibiting the multiple concentric zones of green production and hemolysis for alpha streptococcus and pneumococcus.

Experimental Streptococcus Empyema; Attempts at Prevention and Therapy by Means of Vaccine and Serum.—The importance of streptococcus empyema has not only not decreased but has become intensified during the last year or so by its occurrence as a fatal sequel to influenza as well as in its previous relation to spontaneous bronchopneumonia and bronchopneumonia after measles. GAY and STONE (*Jour. Infect. Dis.*, 1920, xxvi, 265) undertook the present study not simply in an effort to proceed toward a possible practical method of treating streptococcic empyema, but in a desire to contribute some information to the larger question of streptococcic immunity as a whole. The experiments were conducted on rabbits by means of a single pure strain isolated from the lung of a fatal case of bronchopneumonia complicated by empyema and pericarditis, and though culturally of the S. pyogenes group, was immunologically unclassified. Beef infusion broth, pH 7.2 to 7.4, and containing either 1 per cent. glucose or 5 per cent. sterile fresh rabbit serum, was the medium employed. In counting the bacteria it was found that the Wright method, when checked by the gravimetric tests, gave accurate and consistent results. The particular strain was not markedly pathogenic for rabbits by intravenous inoculation. Attempts to increase the general invasive properties of the cultures for rabbits were unsuccessful, as were all attempts to produce bronchopneumonia by bronchial insufflation. Empyema could be procured, however, by injecting small quantities of broth cultures into the pleural cavity, particularly when subcultures from the pleural fluid of an animal with fatal empyema which had been passed through the pleuræ of several animals was employed. Death occurred in from one to seventeen days, the average being five days. Of 103 rabbits injected by a constant dose of a uniform passage culture, 102 showed involvement of one or both chests, with or without pericarditis. There was no evidence of an elective localizing affinity with the strain used. If sufficient amounts of killed and subsequently living cultures of streptococci were given over a considerable period of time, protection against empyema occurred. The total number of bacteria injected, rather than the number of injections, seemed to be the decisive factor. The immune serums produced gave positive agglutination reactions at 55° C. in dilutions of from 1 to 400 to 1 to 12,800. The technical difficulties were surmounted by using a constant homogeneous suspension, made by the addition of phenol in a final concentration of 0.2 to 0.5 per cent. to a twenty-four-hour serum broth culture. The serum of the animals in which active immunity had been proved by intrapleural inoculation was found to vary in tropin content from five to eighty times that of normal rabbit serum. Satisfactory precipitin reactions were obtained

by the immune serums used for therapeutic purposes, the antigens consisting of extracts of ground and dried streptococci. It was shown that the immune sera which contained strong antibodies may have a preventive and curative action when given before, with and after the infecting intrapleural dose of bacteria. Attempted vaccine therapy of the localized empyema gave consistently negative results. The authors conclude that although distinct results in the prevention of experimental empyema and, in rare instances, the cure of empyema may be produced by the use of immune serum from rabbits, they have as yet no evidence of an encouraging serum therapy to offer and that no optimistic conclusions can be drawn from their results as to the possibility of protecting human beings against localized streptococcus infections, or, specifically against empyema, owing to the large amount of vaccine and the prolonged nature of treatment required.

HYGIENE AND PUBLIC HEALTH

UNDER THE CHARGE OF

MILTON J. ROSENAU, M.D.,

PROFESSOR OF PREVENTIVE MEDICINE AND HYGIENE, HARVARD MEDICAL SCHOOL, BOSTON, MASSACHUSETTS,

AND

GEORGE W. McCOY, M.D.,

DIRECTOR OF HYGIENIC LABORATORY, UNITED STATES PUBLIC HEALTH SERVICE, WASHINGTON, D. C.

Pellagra Incidence in Relation to Sex, Age, Season, Occupation and "Disabling Sickness" in Seven Cotton Mill Villages of South Carolina during 1916.—GOLDBERGER, WHEELER and SYDENSTRICKER (*Public Health Reports*, No. 28, xxxv, 1650) conclude their study by the following summary: "(1) During 1916 the incidence of pellagra among the members of the families of white mill operatives of seven representative cotton mill villages of South Carolina was included in our study. (2) In a population of 4399 a total of 115 definite cases, representing a rate of 26.1 per 1000, was recorded. If 73 cases with ill-defined eruption recorded as 'suspects' are included, there were in all 188 cases and an incidence rate of fully 42.7 per 1000 in this population. (3) The data appear to indicate that the disease is rare in children at the age of two and under; that among both males and females up to twenty years the incidence is similar, being higher among children between two and ten years than in persons of the ages of ten to nineteen inclusive; and that among adults twenty to fifty-four years old the incidence is many times higher in females than in males. (4) There was a sharp rise in incidence during April and May, reaching a well-defined peak in June. The season of onset appeared to be confined almost entirely to the six months April to September inclusive. (5) The pellagra rate among both males and females was considerably higher for the non-millworkers than for the millworkers. (6) While